

#2 / 6/26/01
Patent Dade

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

1c821 U.S. PRO
09/811674
03/20/01


Application of: David J. Norris

Serial No.: Not Yet Assigned

Group Art Unit: Not Yet Assigned

Filed: Herewith

Examiner: Not Yet Assigned

- For: METHOD FOR MANUFACTURING HIGH-QUALITY
MANGANESE-DOPED SEMICONDUCTOR
NANOCRYSTALS

Date: March 19, 2001

**FILING OF INFORMATION DISCLOSURE STATEMENT
UNDER 37 C.F.R. 1.97-1.98**

ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

Dear Sir:

Pursuant to the duty of disclosure of information material to the patentability of claims in the above-captioned patent application under 37 C.F.R. 1.56, submitted herewith is a completed Form PTO-1449 and a copy of each reference cited therein.

Authorization is hereby given to charge any fees which may be required, except the issue fee, to Deposit Account 14-0627.

Respectfully submitted,



Andrew G. Isztwan, Esq.
Reg. No. 40,028
(609) 951-2533

FORM PTO-1449 (Modified)		ATTY. DOCKET NO. NECI1085	SERIAL NO. Not Yet Assigned
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)		APPLICANT David J. Norris	
		FILING DATE Herewith	GROUP Not Yet Assigned

REFERENCE DESIGNATION			U.S. PATENT DOCUMENTS				
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
AA		5 2 6 0 9 5 7	Nov. 9, 1993	Hakimi et al.			
AB		5 9 9 0 4 7 9	Nov. 23, 1999	Weiss et al.			
AC		6 0 4 8 6 1 6	Apr. 11, 2000	Gallagher et al.			
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
	AD	Alivisatos, A.P., "Semiconductor Clusters, Nanocrystals, and Quantum Dots," <i>Science</i> , Vol. 271, pp. 933-937, February 16, 1996					
	AE	Efros, Al.L. et al., "Interband Absorption of Light in a Semiconductor Sphere," <i>Sov. Phys. Semicond.</i> , Vol. 16, No. 7, pp. 772-775, July 1982					
	AF	Ekimov, A.I. et al., "Quantum Size Effect in the Optical Spectra of Semiconductor Microcrystals," <i>Sov. Phys. Semicond.</i> , Vol. 16, No. 7, pp. 775-778, July 1982					
	AG	Brus, L.E., "A Simple Model For the Ionization Potential, Electron Affinity, and Aqueous Redox Potentials of Small Semiconductor Crystallites," <i>J. Chem. Phys.</i> , Vol. 79, No. 11, pp. 5566-5571, December 1, 1983					
	AH	Murray, C.B. et al., "Synthesis and Characterization of Nearly Monodisperse CdE (E = S, Se, Te) Semiconductor Nanocrystallites," <i>American Chemical Society</i> , pp. 8706-8715, 1993					
	AI	Norris, D.J. et al., "Measurement and Assignment of the Size-Dependent Optical Spectrum in CdSe Quantum Dots," <i>Physical Review B</i> , Vol. 53, No. 24, pp. 16338-16346, June 15, 1996-II					
	AJ	Murray, C.B. et al., "Self-Organization of CdSe Nanocrystallites into Three-Dimensionally Quantum Dot Superlattices," <i>Science</i> , Vol. 270, pp. 1335-1338, November 24, 1995					
	AK	Colvin, V.L. et al., "Light-Emitting Diodes Made From Cadmium Selenide Nanocrystals and a Semiconducting Polymer," <i>Nature</i> , Vol. 370, pp. 354-357, August 4, 1994					
	AL	Vlasov, Y.I. et al., "Synthesis of Photonic Crystals for Optical Wavelengths from Semiconductor Quantum Dots," <i>Advanced Materials</i> , Vol. 11, No. 2, pp. 165-169, 1999					
	AM	Wang, Y. et al., "Three-Dimensionally Confined Diluted Magnetic Semiconductor Clusters - Zn _x Mn _y S," <i>Solid State Communications</i> , Vol. 77, No. 1, pp. 33-38, 1991					
EXAMINER			DATE CONSIDERED				
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							

FORM PTO-1449 (Modified)				ATTY. DOCKET NO. NECI1085	SERIAL NO. Not Yet Assigned		
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT David J. Norris			
				FILING DATE Herewith	GROUP Not Yet Assigned		
REFERENCE DESIGNATION				U.S. PATENT DOCUMENTS			
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
FOREIGN PATENT DOCUMENTS							
		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION YES NO
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
AN	Bhargava, R.N. et al., "Optical Properties of Manganese-Doped Nanocrystals of ZnS (etc.)," <i>Physical Review Letters</i> , Vol. 72, No. 3, pp. 416-419, January 17, 1994						
AO	Oka, Y et al., "Excitonic Properties of Nanostructure Semimagnetic Semiconductors," <i>Journal of Luminescence</i> , Vol. 70, pp. 35-47, 1996						
AP	Sooklal, K. et al., "Photophysical Properties of ZnS Nanoclusters with Spatially Localized Mn ²⁺ ," <i>J. Phys. Chem.</i> , No. 100, pp. 4551-4555, 1996						
AQ	Levy, L. et al., "Control of the Size and Composition of Three Dimensionally Diluted Magnetic Semiconductor Clusters," <i>J. Phys. Chem.</i> , Vol. 100, pp. 18322-18326, 1996						
AR	Levy, L. et al., "Three Dimensionally Diluted Magnetic Semiconductor Clusters Cd _{1-y} Mn _y S With a Range of Sizes and Compositions: Dependence of Spectroscopic Properties on the Synthesis Mode," <i>J. Phys. Chem. B</i> ; pp. 9153-9160, 1997						
AS	Feltin, N. et al., "Unusual Static and Dynamic Magnetic Properties of Cd _{1-y} Mn _y S Nanocrystals," <i>Journal of Applied Physics</i> , Vol. 87, No. 3, pp. 1415-1423, February 1, 2000						
AT	Counio, G et al., "CdS:Mn Nanocrystals in Transparent Xerogel Matrices: Synthesis and Luminescence Properties," <i>J. Phys. Chem.</i> , Vol. 100, pp. 20021-20026, 1996						
AU	Counio, G. et al., "Synthesis and Pholuminescence of Cd _{1-x} Mn _x S (x ≤ 5%) Nanocrystals," <i>J. Phys. Chem. B</i> , Vol. 102, pp. 5257-5260, 1998						
AV	Mikulec, F.V. et al., "Organometallic Synthesis and Spectroscopic Characterization of Manganese-Doped CdSe Nanocrystals," <i>J. Am. Chem. Soc.</i> , Vol. 122, pp. 2532-2540, 2000						
AW	Hoffman, D.M. et al., "Giant Internal Magnetic Fields in Mn Doped Nanocrystal Quantum Dots," <i>Solid State Communications</i> , Vol. 114, pp. 547-550, 2000						
EXAMINER		DATE CONSIDERED					
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance <u>and</u> not considered. Include copy of this form with next communication to applicant.							

FORM PTO-1449 (Modified)			ATTY. DOCKET NO. NECI1085	SERIAL NO. Not Yet Assigned
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT			APPLICANT David J. Norris	
(Use several sheets if necessary)			FILING DATE Herewith	GROUP Not Yet Assigned

REFERENCE DESIGNATION		U.S. PATENT DOCUMENTS					
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION
							YES NO

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

AX	Furdyna, J.K., "Diluted Magnetic Semiconductors," <i>J. Appl. Phys.</i> , Vol. 64, No. 4, pp. R29-R64, August 15, 1998
AY	Gupta, J.A. et al., "Spin Coherence in Semiconductor Quantum Dots," <i>Physical Review B</i> , Vol. 59, No. 16, pp. R10421-R10424, April 15, 1999
AZ	Ando, K. et al., "Magneto-Optical Study of Quantum Confinement in Cd(S,Se) Quantum Dots," <i>Physical Review B</i> , Vol. 47, No. 20, pp. 13462-13465, May 15, 1993
BA	Awschalom, D.D. et al., "Electron Spin and Optical Coherence in Semiconductors," <i>Physics Today</i> , Vol. 52, pp. 33-38, June 1999
BB	Ladizhansky, V. et al., "Surface Properties of Precipitated CdS Nanoparticles Studied by NMR," <i>J. Phys. Chem. B.</i> , No. 102, pp. 8505-8509, 1998
BC	Hines, M.A. et al., "Bright UV-Blue Lumiscent Colloidal ZnSe Nanocrystals," <i>The Journal of Physical Chemistry B</i> , Vol. 102, No. 19, pp. 3655-3657, May 7, 1998
BD	Gallagher, D. et al., "Homogeneous Precipitation of Doped Zinc Sulfide Nanocrystals for Photonic Applications," <i>J. Mater. Res.</i> , Vol. 10, No. 4, pp. 870-876, April 1995
BE	Tamura, M. et al., "Elimination and Catalytic Decomposition of Dialkylmanganese Species," <i>J. Organometal. Chem.</i> , Vol. 29, pp. 111-129, 1971
BF	Oczkiewicz, B. et al., "Intra-Manganese Absorption and Luminescence in Zn, Mn, Se Semimagnetic Semiconductor," <i>Solid State Communications</i> , Vol. 64, No. 1, pp. 107-111, 1987
BG	Xue, J. et al., "Temperature Evolution of the 2.1 eV band in the Zn _{1-x} Mn _x Se System for Low Concentration," <i>Journal of Luminescence</i> , Vol. 78, pp. 173-178, 1998

EXAMINER	DATE CONSIDERED
----------	-----------------

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

FORM PTO-1449 (Modified)				ATTY. DOCKET NO. NECI1085	SERIAL NO. Not Yet Assigned		
LIST OF PATENTS AND PUBLICATIONS FOR APPLICANT'S INFORMATION DISCLOSURE STATEMENT (Use several sheets if necessary)				APPLICANT David J. Norris			
				FILING DATE Herewith	GROUP Not Yet Assigned		
REFERENCE DESIGNATION		U.S. PATENT DOCUMENTS					
EXAMINER INITIAL	DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE	
FOREIGN PATENT DOCUMENTS							
	DOCUMENT NUMBER	DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
						YES	NO
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)							
BH	Nomura, S. et al., "Large'g Value in CuCl Semiconductor Microcrysallites," <i>Physical Review B</i> , Vol. 47, No. 23, pp. 1602416027, June 15, 1993						
BI	Nomura, S. et al., "Confined Excitons in a Semiconductor Quantum Dot in a Magnetic Field," <i>Physical Review B</i> , Vol. 49, No. 19, pp. 13571-13582, May 15, 1994						
BJ	Kuno, M. et al., "Magnetic Circular Dichroism Study of CdSe Quantum Dots," <i>Journal of Chemical Physics</i> , Vol. 108, No. 10, pp. 4242-4247, March 8, 1998						
BK	Kennedy, T.A. et al., "Symmetry and Electronic Structure of the Mn Impurity in ZnS Nanocrystals," <i>Physical Review B</i> , Vol. 52, No. 20, pp. R14356-R14359, November 15, 1995						
BL	Ludwig, G.W. et al., "Electron Spin Resonance in Semiconductors," <i>Solid State Physics - Advances in Research and Applications</i> , Volume 13, pp. 223-304, 1962						
EXAMINER			DATE CONSIDERED				
EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.							